
Review of Literature on Managing Information Technology Investment for Firm Performance: A Bibliometric Approach

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Ilmudeen A.*

Faculty of Management and Commerce, South Eastern University of Sri Lanka

Abstract

The many-sided view or the role of information technology (IT) towards firm performance has been extensively examined. The academic scholars and industry practitioners agree that there are underlying theories for managing IT, still, the literature is suffering the comprehensive review-based research. Similarly, though there is extensive empirical evidence on managing information technology investment and firm performance, complete thoughtful research directions and the recent progress in the field are limited. Hence, a strong understanding of the present lay of the paradigm is required to assist in this research domain. Against these backdrops, this study explores an overview of this research field using a bibliometric approach focusing on the published academic journal articles in Web of Science for the period between 2000 and 2021. This study demonstrates maps for the journal name, keywords, title and abstract section keywords, co-authorship for counties, co-citation for a cited author, and cited sources are demonstrated.

Keywords: Bibliometric Study, Firm Performance, IT investment, Literature Review.

Introduction

Managing IT has been taken into consideration in both practice and theoretical debates for long years (Ilmudeen & Bao, 2020). In recent years, business organizations have invested a huge amount of money in IT. However, the payoff from IT is always a major

* Corresponding Author- ilmudeena@seu.ac.lk

concern for managers and executives (Ilmudeen & Yukun, 2018). Despite the increasing amount of investment in IT, managing IT has always become complicated due to its unclear cost relationships, uncertain return on investment, quick technological changes, and unreliable business environments. Similarly, scholars claimed that today's business settings have become increasingly vibrant and competitive; hence the managing IT is of utmost concern for managers and executives. Managing IT¹ remains significant as the business environment ever more becomes uncertain (Son, Lee, Lee, & Chang, 2014). Similarly, the empirical studies in the management of IT or the multifaceted socio-technical study that impact firm performance has fairly received limited attention (Davison, Kien, & Ying, 2008; Ji, Min, & Han, 2007; Peng, Quan, Zhang, & Dubinsky, 2016). In this tenet, past studies warrant further examination of the importance of managing IT (Ilmudeen & Bao, 2020).

Managing IT investment is principally the responsibility of management hierarchy (Ali, Green, & Robb, 2015), and it comprises managerial efforts such as planning, organizing, controlling, and directing the use of IT within an organization (Wang, Shi, Nevo, Li, & Chen, 2015). In this line of thought, a firm's IT investment goes through a consecutive stage of planning, appraisal, and some efforts are made to better align the IT investment with business strategy to create IT business value (Tallon, Kraemer, & Gurbaxani, 2000). The successful management of IT highlights strategic alignment, risk and resource management, value delivery, and performance management (Prasad & Green, 2015). The prior studies emphasized that issues like the IT productivity paradox (inconsistency between huge IT investments and its lack of benefits), and the business value of IT may have significant implications for organizations in the context of managing IT investment (Peng et al., 2016).

In past studies, the view of how the performance outcomes and the importance of managing IT's impact on firm performance have been highlighted in various ways (Ilmudeen & Yukun, 2018; Turel, Liu, & Bart, 2017; Wu, Straub, & Liang, 2015). For instance, it permits empirical studies with either mediation or moderator model to elucidate whether IT generates business value directly or indirectly with firm factors (Cao, Wiengarten, & Humphreys, 2011). Business organizations increasingly rest on IT and integrate IT resources with other firm-level and managerial processes to stay endure and respond quickly to the market changes (Zhang, Zhao, & Kumar, 2016). Against these backdrops, there are past studies that emphasized the significance of managing IT's impact on firm performance and necessitated further studies to explore more on these areas (Ilmudeen & Yukun, 2018; Turel et al., 2017; Wu et al., 2015).

In literature review-based research, numerous prior studies present their finding in various forms. The approaches for this kind of literature review research are meta-analysis, systematic literature review, case study analysis, bibliometric analysis, and so on. In recent times, managing information technology investment and firm performance have received

¹ Other studies have used supplementary terms such as IT management and IT governance to refer to similar ideas (Ilmudeen & Yukun, 2018; Prasad, Heales, & Green, 2010).

much attention among scholars and industry practitioners. But, there are limited studies that focus to explore its potential in this domain using a bibliometric approach. Hence, the purpose of this study is to review the existing literature on managing information technology investment and firm performance for two decades (2000 - 2021) by using the bibliometric approach. For this research study, the published articles were collected from one of the popular databases Web of Science. Using the previously published article, this research aims to explore information about the journal name, possible keywords, title, and abstract section keywords, author details such as co-authorship for counties, co-citation for cited author, and cited sources.

This research contributes in the following respects and that is believed noteworthy from this study. Firstly, the exploration of bibliometric analysis reveals various remarkable insights about the prior published research work in managing IT investment and firm performance. Hence, the scholars and learners from this field can understand various trends, several existing publications, its types, research hints, various publication outlet, etc., Secondly, the citation analysis reveals to understand the present status of the research on managing IT investment and firm performance from authors who are regularly publishing, whose publication regularly cited, the countries they are belonging, the institution they are belonging, their network of co-authors...etc. Finally, each visual map shows various clusters, their connection, no of occurrence or counts...etc. By looking at these networks and visual maps the scholars and learners can get a comprehensive idea about the particular analysis.

Managing IT investment and firm performance

The IT investment can drive firm performance (Ilmudeen & Yukun, 2018; Turel et al., 2017). But, the IT investments alone are not sufficient to drive firm performance (Wang et al., 2015). Managing IT consists of the activities including the planning, organizing, governing, and leading the use of IT within the business firm (Boynton & Zmud, 1987; Van Der Zee & De Jong, 1999; Wang et al., 2015). Scholars claimed that the effective use of IT considerably rests on the management of IT and IT governance practices which are greatly significant to its value generation from IT investment (e.g., Ali et al., 2015; Prasad et al., 2010; Wu et al., 2015). Hence, IT can have a positive outcome, no outcome, or even a negative outcome on firm performance, subject to how well IT is managed and governed (Turel et al., 2017). Strongly managing IT investment by arranging different functional areas activities, restructuring operational processes, aligning the IT and business department, systematic inspection of IT priorities, and sufficient allocation of IT assets businesses can achieve performance from IT investment (Wang et al., 2015).

According to Weill and Ross (2004, p. 8), in the context of managing IT investment, the term management decides the real amount of money invested and the areas in which the money is invested in a particular year, whereas the governance decides who possess the decision rights for how much the firm invests in IT. In this ideology, a firm's IT investment projects are evaluated systematically including a successive phase of planning, review, and

efforts are made to well align the IT investment with business strategy to create IT business value (Tallon et al., 2000). Further, managing IT remains noteworthy as the business environment ever more becomes unreliable (Son et al., 2014)

The managing IT investment has been expressed in various lenses such as effective IT governance (Wilkin, Couchman, Sohal, & Zutshi, 2016; Wu et al., 2015), IT capabilities (e.g., IT management and IT technical skills)(Chen, Wang, Nevo, Benitez, & Kou, 2017), IT practices (Turel et al., 2017) and IS resources (e.g., IS planning and change management, and IS-business partnerships) (Wade & Hulland, 2004). Hence, managing IT is the firm's IT capability to generate value from IT investment, and IT as a firm's engineering artifact can be managed systematically to realize firm performance (Ilmudeen & Yukun, 2018).

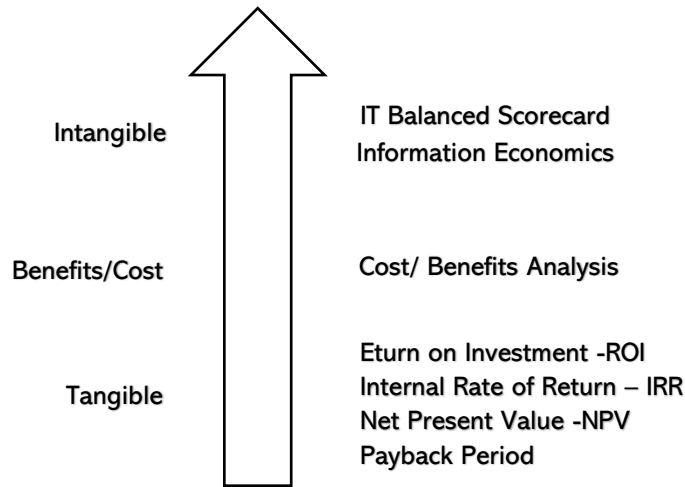


Figure 1: Performance Measurement Approaches

The traditional performance measures (see figure 1) like ROI, NPV, IRR, and payback method involve monetary values. However, when these are applied to IT investment, the issues arise as Information System often generates intangible performance for IT investment including enhanced customer service, technical and managerial skills, competitive advantage, and knowledge assets that are challenging to measure (Wilkin & Chenhall, 2010). As a result, pinpointing how IT investment generates value will be challenging as the benefits become absorbed into business processes, hard to measure IT at the business department level, and it is less apparent at the financial reporting level (Wilkin & Chenhall, 2010).

Research Design and Method

The bibliometric analysis is a quantitative analysis approach that uses statistical tools to quantify the inter-relationships and impacts of publications within a given area of research. For this study, the author employed a bibliometric analysis in managing information technology investment and firm performance. Hence, the author extracted data for this

Keywords Visualization

In keyword visualization, the repeatedly co-occurring keywords, and the interaction among these keywords were explored for the dataset. Common functional words like prepositions, pronouns, and articles are excluded from this analysis. A keyword to be considered in this visualization, a word should appear a minimum of ten times in all the articles combined. Out of 2309 keywords that appeared in the 436 research articles in the dataset, 71 words match with the cut-off. In this map, the first 3 highest occurrence keywords are performance (166), information technology (121), and management (85) respectively. Below figure 3 shows the keywords, their co-occurrence, and link are shown.

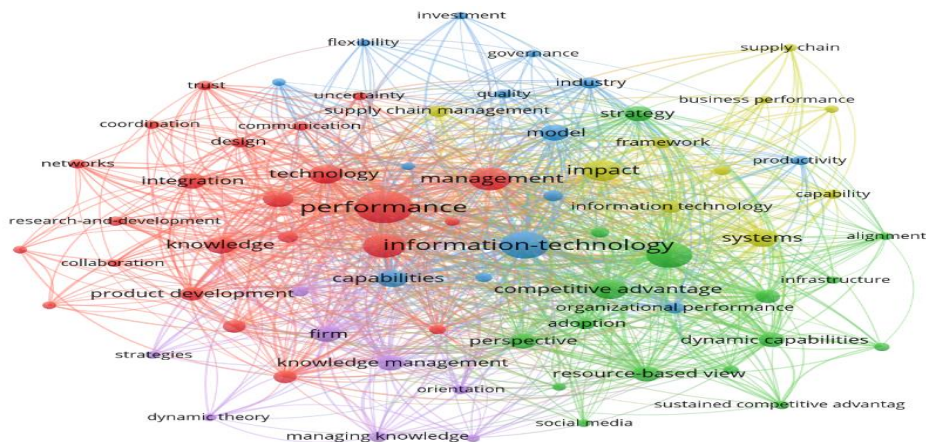


Figure 3: Keywords Visualization

Title and Abstract Section Keywords

Figure 4 shows the visualization of title and abstract field keywords from these 436 articles. In this dataset context, the keywords such as investment, firm, business value, etc have been highlighted. Out of 9860 terms that set to the minimum number of occurrences of a term is 15 that appeared in the dataset 436 articles, 152 terms met the threshold. Further, out of these 152 terms, only 100 terms were selected for the below map and that had 4 clusters. Accordingly, the highest occurrence terms such as technology 205, information 120 these both were belonging to cluster 1. The literature had 105 and resources 104 occurrences from cluster 2. Similarly, the design methodology approach had 96 and originality value 91 occurrences which were belonging to cluster 3.

Co-citation and Cited Author

Figure 6 shows the co-citation and cited author among the 436 articles. This figure is extracted from only 100 authors. There are 4 clusters for these maps. In which we can see many popular scholar's publications in the Information system research field have been cited.

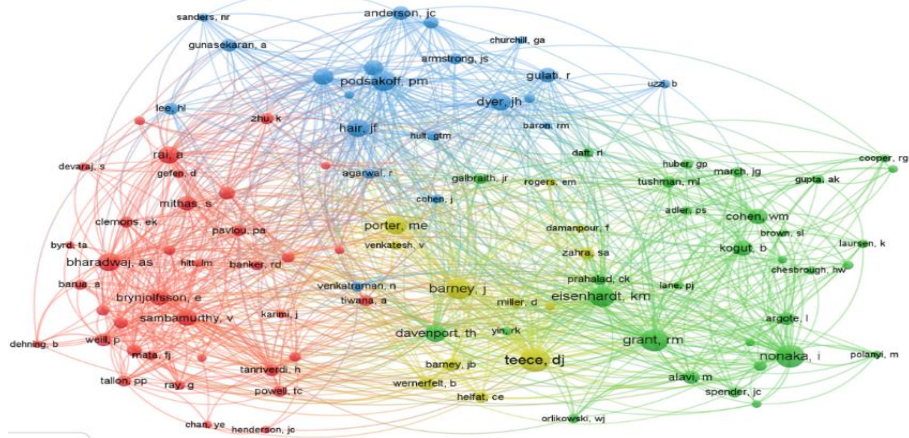


Figure 6: Co-citation and Cited Author

Co-citation and Cited Sources

Figure 7 shows the map for the co-citation and cited sources. In which the minimum number of citations of a source is set to 20. Among the 6783 sources, 188 met the threshold with 5 clusters. In which the cluster for journals is information system journals.

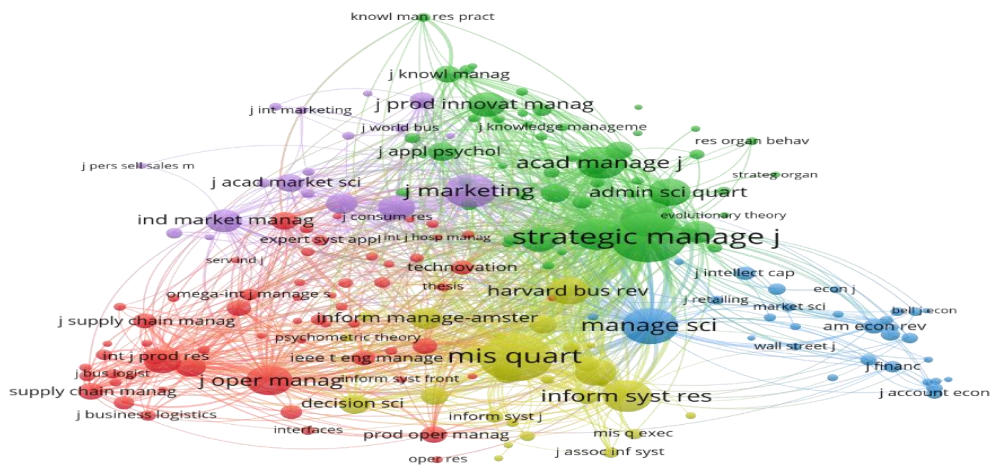


Figure 7: Co-citation and Cited Sources

Accordingly, the strategic management journal belongs to a cluster that has a total citation of 1343. The MIS quarterly belongs to cluster 4 that has a total citation of 1278. The management science belongs to cluster 3 and has a total citation of 748. The information system research belongs to cluster 4 that has total citations of 559.

Conclusion

Despite the increasing amount of IT investment, managing IT has received huge attention among the academic, scholarly, and practitioner communities. Though there are extensive empirical findings on managing information technology investment and firm performance, comprehensive research directions and the recent developments in this research domain using bibliometric analysis are scarce. Hence, this study explores an overview by using a bibliometric study focusing on the published academic journal articles in Web of Science for the period 2000 - 2021. The findings of this study demonstrate various maps covering the journal name, keywords, title and abstract section keywords, co-authorship for counties, co-citation for a cited author, and cited sources, in the context of managing information technology investment and firm performance.

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Author

Dr. A. Ilmudeen is a Senior Lecturer in Management and IT at Faculty of Management and Commerce, South Eastern University of Sri Lanka. He received his PhD in Management Science and Engineering at HUST, P.R China. His publications appear in index journals such as *Industrial Management and Data Systems*, *the Journal of High Technology Management Research*, *Enterprise Information Management*, *Benchmarking: an International Journal*, *Foresight*, and *European Journal Of Innovation Management*.
